



Navigating Maritime Shipping Emissions in Your Supply Chain: What We Heard

March 2025



**OCEANS
NORTH**





Navigating Maritime Shipping Emissions in Your Supply Chain: What We Heard

CREDITS

Oceans North
© March 2025
Oceans North. 2025
Navigating Maritime Shipping Emissions
in Your Supply Chain: What We Heard
Ottawa: Oceans North

CONTACT US

Oceans North
236 Metcalfe Street, Suite 301-302,
Ottawa, ON K2P 1R3
Canada
www.oceansnorth.ca



Summary of Session

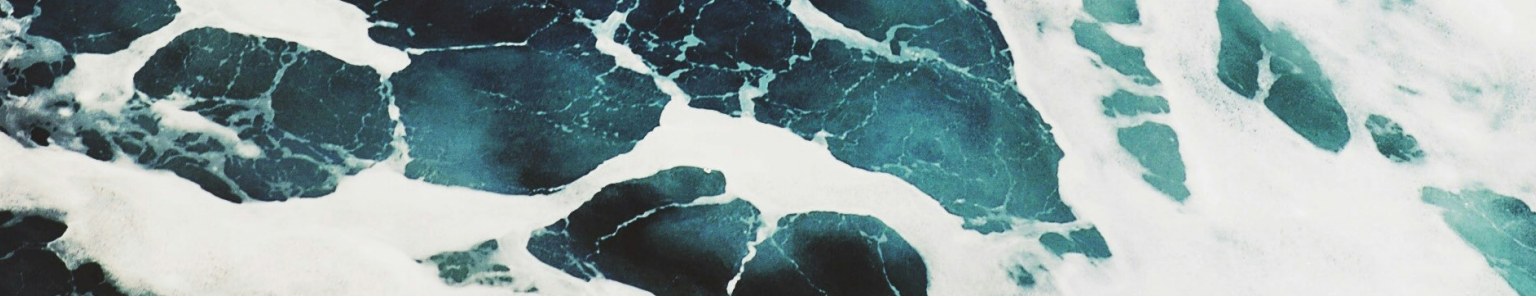
At GLOBExCHANGE 2025, Oceans North brought together industry experts and conference participants for a collaborative workshop entitled **Navigating Maritime Shipping Emissions in Your Supply Chain**.

The purpose of the workshop was to address the role shipping plays in moving goods across the globe, with a focus on raising awareness of the supportive financing, technology, fuel, and policy solutions needed for decarbonization. Presenters and participants dove into practical tools for understanding, measuring, and reducing shipping emissions to help make good on their net-zero supply chain commitments.

The following report summarizes insights from presenters, points of debate, and Oceans North's takeaways from the discussion.

ABOUT GLOBExCHANGE:

GLOBExCHANGE 2025 convened hundreds of North America's foremost climate and sustainability leaders to connect and learn how we can collectively grow a clean economy. From February 11–13, 2025, in Toronto, Canada, attendees explored the solutions, skill sets, and dollars needed to turn sustainability challenges into real commercial commitments and projects.



Why Do Marine Shipping Emissions Matter?

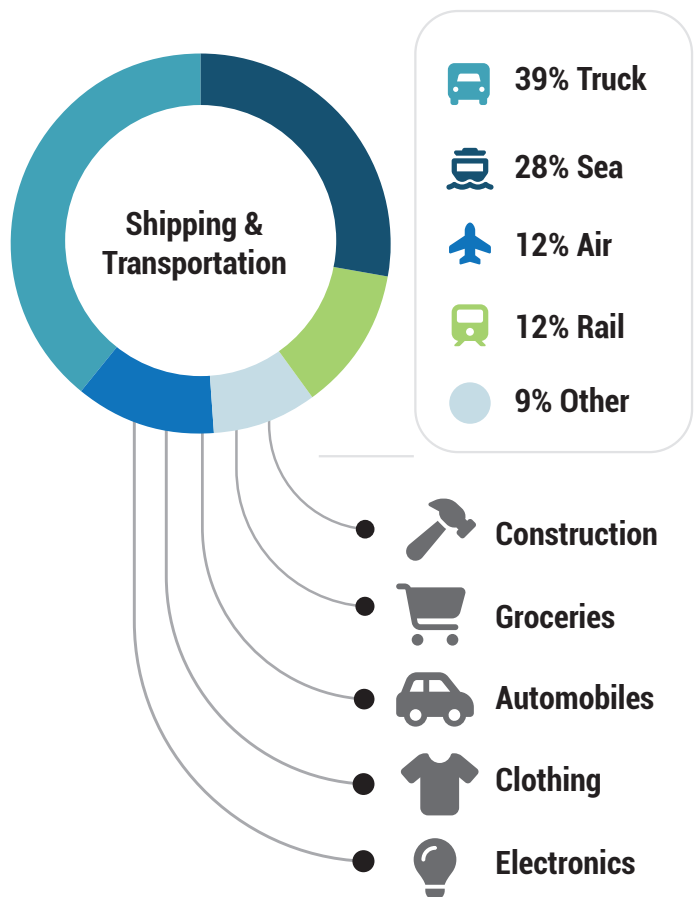
Marine shipping impacts nearly all supply chains. **Ocean-going vessels carry 80 percent of global trade** and use some of the transportation sector's most carbon-intensive fuels. These activities make up almost 3 percent of greenhouse gas (GHG) emissions worldwide. Reducing emissions from this part of the supply chain is key to meeting global emissions targets, including the International Maritime Organization's (IMO) new greenhouse gas regulations, which call for net-zero emissions by 2050.

Despite shipping's importance to global supply chains and its significant environmental impact, however, the role of the maritime sector has sometimes been overlooked in Canada. Businesses are focused on reducing emissions through industrial processes, building efficiencies, and road and rail transport, with marine shipping far from top of mind.

Nevertheless, Canada has the longest coastline in the world and borders three oceans. Almost all Canadian imports and exports sourced outside the United States travel by ship. Shipping is a key part of our supply chains. Domestically, transport by water comprises more than a quarter of merchandise trade and shipping and it will only become more important in the future as Canada diversifies trade relationships globally. Shipping routes through the Canadian Arctic are also increasingly accessible as sea ice melts due to climate change: ship traffic in the region has tripled over the last 25 years.

To effectively access markets and move goods, Canadian businesses and cargo shippers—from large retailers like Canadian Tire and Loblaws to agricultural exporters across the country—must include shipping and port logistics in their supply chain planning and optimization. This requires that efficiency, fuel consumption, and costs of marine shipping and port-side logistics are necessarily tracked, measured, and costed, meaning that GHG emissions can also be tracked, measured, and reduced.

Mode of Transport for Domestic Merchandise



Source: <https://www.international.gc.ca/trade-commerce/economist-economiste/analysis-analyse/logistics-vulnerability-vulnerabilite-logistique.aspx?lang=eng>

Our Takeaways on the Work Ahead

Oceans North was pleased to bring the only event to GLOBExCHANGE focused on marine shipping. In many conversations over the week, it became clear there is work to do to expand awareness of shipping emissions and the available solutions among industry and climate professionals. To be successful, we must:

- **Raise awareness** of the impact shipping has on our oceans and economic well-being, especially at this time when geopolitical turmoil has Canada considering current and future trade relationships. This work is particularly important on the demand side, where we must clarify how shipping emissions are currently very significant in Canadian supply chains and contribute to emissions across our economy.
- **Engage Canada's largest shippers**, especially those who have already made commitments to decarbonize supply chains, to ensure that they are accounting for and actively working to reduce these emissions. Further work is required to convey the business case to them so they see the solutions are within reach.
- **Convene participants** to discuss the issues from across the supply chain, including fuel producers and ship owners to everything in between.
- **Create open-source tools** so that business and climate leaders are supported.
- **Ensure investor confidence** with stable financing programs and policies in support of clean shipping that are not vulnerable to political cycles.
- **Be persistent.** As with other sectors, we can expect both setbacks and leaps forward. Focusing on progress and emissions reduction over time will be the true test for success.

NAVIGATING MARITIME SHIPPING EMISSIONS IN YOUR SUPPLY CHAIN

WEDNESDAY, FEB 12 | 3:45 PM - 4:45 PM



Charles Haines

Executive Director of
Decarbonization of Air, Rail,
and Marine,
Transport Canada



Amy Nugent

Associate Director of
Marine Climate Action,
Oceans North



Danielle Southcott

Founder & CEO,
Veer Group



Andrew Waddell,

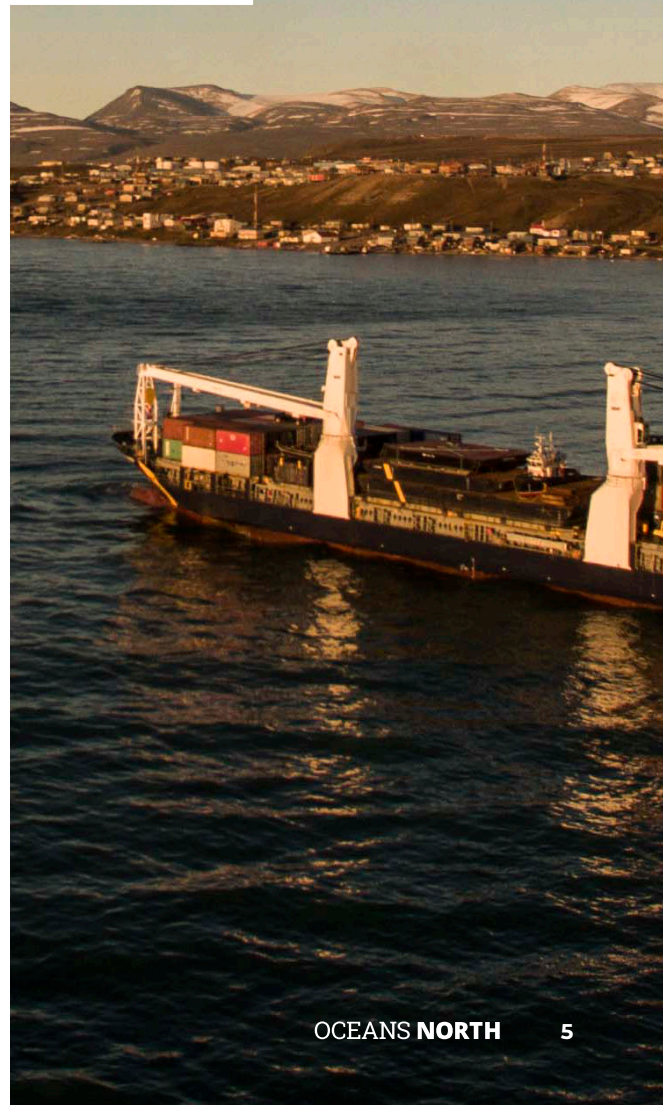
Manager, Shipping
Decarbonization,
RMI

Summary of Panel Presentations

Between the panelists, there was lively debate about the most productive way to discuss and frame the problem of reducing emissions.

For example, should we talk about “decarbonizing” the sector, or does this wrongly assume fossil fuels will always be a technological and operational baseline? One panelist suggested that the debate be reframed so that we begin with the premise that shipping should be zero emissions rather than that the carbon intensity of existing fuels should be reduced. They urged that the conversation move away from “zero-emission fuels” to “energy”—a broader, more enabling idea that includes design, energy efficiency, and zero-emission propulsion, including wind.

A question also emerged about the role of “bridging solutions,” and specifically, about whether biofuels and LNG could play a role in shipping decarbonization. The conclusion was that neither fuel could lead to net-zero emissions for the sector by 2050 and that each of these fuels entails significant financial and environmental risks.





International Maritime Organization Regulations on Shipping Emissions

Charles Haines, an Executive Director at Transport Canada focused on policies related to the decarbonization of air, rail and marine transportation, discussed the following timeline of the IMO's ambitious work to achieve GHG reductions in international shipping:

1. 2021 to January 2023: Short-term measures were adopted with the goal to design standards for ships and to create an operational carbon intensity indicator (so ships have a sense of what their emissions are and how much they emit).
2. July 2023: Goal for net-zero by 2050 set, with 20-30 percent reduction by 2030 and 70-80 percent reduction by 2040 (from 2008 levels). Goal of 5-10 percent uptake of clean energy and fuels by 2030.
3. For approval in April 2025 and adoption October 2025: binding marine fuel GHG intensity standard and maritime GHG pricing mechanism.

Haines said that the IMO seeks global acceptance of these mid-term measures. Towards this goal, IMO is grappling with many questions, including:

1. Which ships/voyages will the measures cover?
2. Which emissions from ships will the IMO regulate/price so that accounting is done on a full lifecycle basis, per IMO commitments?
3. How can a ship comply with the net-zero measures? For instance, will there be a compliance payment, or can carbon credits be earned and/or traded for compliance purposes?
4. What is the target GHG intensity level and price per excess tonne? How will zero-emission fuels and technologies be incentivized?
5. If a measure raises money, how will proceeds be distributed to uphold the principle of marine energy transition, including in a way that supports disproportionately impacted communities?

Key players in the EU, Japan, and China have come forward with papers showing that meeting ambitious targets is possible. There is significant alignment on the world stage to deliver on the 2023 IMO Strategy on Reduction of GHG Emissions from Ships.

What the Government of Canada is Doing

Haines described initiatives by the Government of Canada to support the adoption of clean fuels and technologies while encouraging economic growth. One such initiative is Canada's \$165-million commitment to the Green Shipping Corridor Program, which funds clean technology and infrastructure at ports and terminals as well as studies and pilots of clean fuel propulsion systems for shipping vessels.



Industry Solutions to Reducing Emissions

Net Zero Vessels

Danielle Southcott is founder of Veer Voyage, a multi-award-winning clean shipping startup, and was named by the Royal Institute of Naval Architects as one of the most influential women of the century. As a Board Member of the Zero Emission Shipping Technology Association (ZESTAs), she is creating new markets for and advancing large-scale uptake of maritime zero-emissions innovations.

Southcott discussed net-zero solutions that are already hitting the water, as well as other solutions with high technology readiness levels, many of which her company plans to implement.

Veer Voyage's small container ship will, once built, use a combination of wind propulsion and an auxiliary hydrogen fuel cell to keep emissions to zero. Southcott outlined the ship's design, functionality and its economic competitiveness relative to ships powered by traditional marine diesel. The ship is 100 metres, designed to carry 152 twenty-foot containers, and to be reliable and cost-competitive for trans-Atlantic voyages. Veer estimates that long-term container-ship charterers will save 25 percent on energy costs with stable pricing through long-term agreements.

Veer Voyage is a fully designed and ABS-approved ship, backed by PROW Capital in the Netherlands, that is moving towards a final investment decision based on commitments from shippers to purchase zero-emission shipping as part of their efforts to reduce emissions. Veer Voyage and UPS, for example, have reached an agreement to use absolute zero-emission shipping on trans-Atlantic voyages. At the time of our event, Veer was "one client away from being able to order two of these vessels." This highlights the potential for these technologies to expand across Canadian waters.

"The future of energy must be the cleanest, longest-term solution. **So when I say zero-emission, I mean verifiably absolute-zero-emission.** By going straight to zero, we will exceed reduction targets set by changing policies and will avoid costly, incremental steps, including ordering dual-engine ships fueled by biofuels or LNG that have no chance of reaching targets and come with a host of other risks, including stranded capital."

Danielle Southcott, Founder & CEO, Veer Group





READY TECHNOLOGY

Technology Readiness Levels are measures used to evaluate the maturity of technologies, from basic research (TRL 1), to proof of concept, piloting, demonstration in operational context (TRL 5, 6, 7), to proven functionality in all applicable operational contexts (TRL 8, 9), meaning that the technology is ready for broader deployment and commercialization.

A 2023 study from ZESTAs shows that numerous zero-emission technologies are ready for demonstration, deployment, and upscaling. For example:

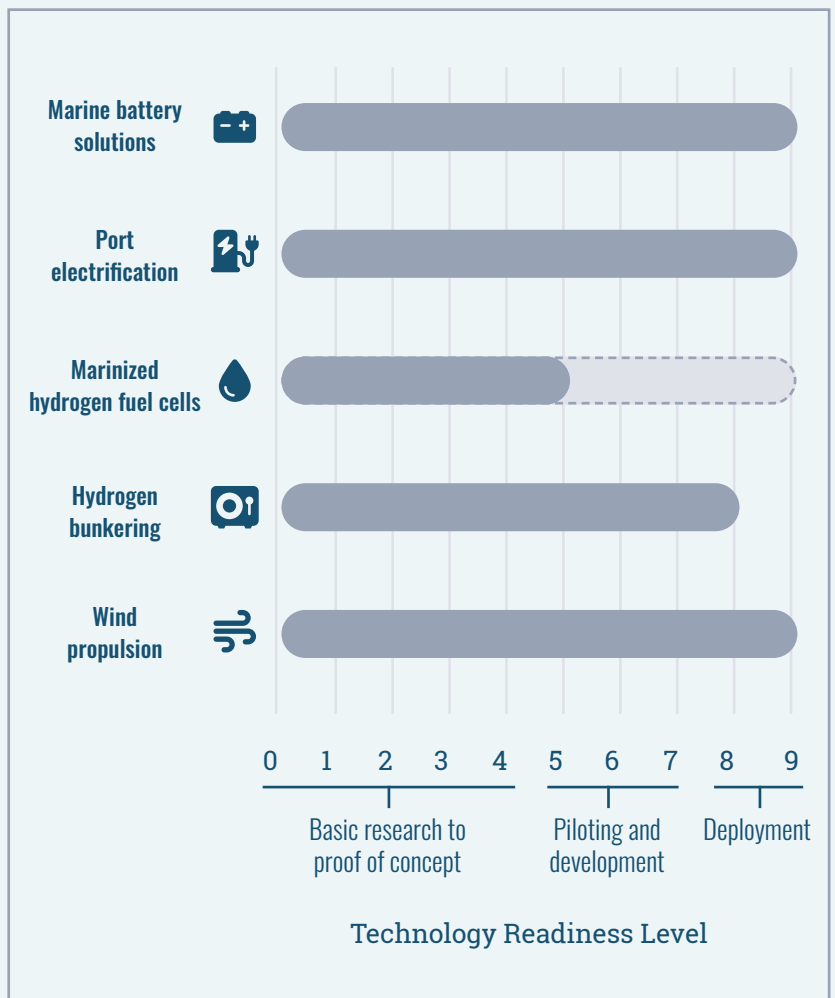
Marine battery solutions are at TRL 9: candidates for battery solutions include ferries, tugs, and bunker tankers.

Port electrification is at TRL 9 (deployment).

Marinized hydrogen fuel cells are at TRLs 5 to 9 (pilot scale testing) – for example, the Energy Observer research vessel has been in operation since 2017 and uses a combination of renewable energy and hydrogen power.

Hydrogen bunkering is at TRL 8 (demonstration under expected marine conditions).

Wind propulsion is at TRL 9, with various technologies in full operation.



Source: <https://zestas.org/wp-content/uploads/2023/06/ZESTAs-ISWG-GHG-15-INF.2-Commercial-Readiness-of-Absolute-Zero-GHG-Technologies.pdf>

New Fuels and Green Shipping Corridors

The discussion continued around the green fuels needed to power the energy transition and the shipping corridors that will connect producers to consumers. “Early investments in e-fuel production and infrastructure are needed today if shipping is going to meet the decarbonization goals set by the IMO,” said Andrew Waddell, a Manager on RMI’s Shipping team. He explained that biofuels and LNG will not be sufficient to achieve the IMO’s net-zero target. Although biofuels may currently be the cheaper alternative to e-fuels, biofuels won’t be able to satisfy all of the shipping industry’s demand due to limited feedstocks, and over time, competition from other sectors will increase biofuels’ costs.

As a better alternative, Waddell discussed the role of **e-fuels, which are made from renewable electricity, clean hydrogen and, in some cases, biogenic carbon dioxide.** While currently more expensive than biofuels, Waddell said their benefits are that they are scalable and offer zero or near-zero emissions. Early adopters of e-fuels are key to meeting the decarbonization goals set by the IMO, and Waddell’s team is working to unlock the business case for these early adopters. This work includes:

1. Identifying the most competitive places for e-fuel production and deployment and then working with ports to develop strategies and infrastructure to support procurement and bunkering of low-carbon fuels to make the net-zero transition more cost effective.
2. Modeling impacts of IMO and national policies that can enable marine shipping to meet its net-zero goals.
3. Establishing dedicated routes, also known as Green Shipping Corridors, that use low-carbon fuels. Over 60 green corridor efforts have been announced, with the most impactful led by first movers collaborating to answer the technological and operational questions of low-carbon fuel deployment on routes. He highlighted successful early examples in Seattle and Tacoma, Washington, where ports are in advanced feasibility and costing analysis for three green corridors—one focusing on cruise ships, one on car carriers, and one on container ships—all with clean methanol.

“Early investments in e-fuel production and infrastructure are needed today if shipping is going to meet the decarbonization goals set by the IMO.”

Andrew Waddell, RMI Team Manager

4. Making tools accessible and practical to help freight customers with an interest in reducing their indirect emissions from shipping. For example, RMI and the Mærsk Mc-Kinney Møller Center for Zero Carbon Shipping, in collaboration with organizations across the value chain, have launched a product called Katalist, a book-and-claim registry that allows freight customers to purchase emission savings from vessels using low-emission fuels (even if their cargo isn’t transported by these vessels) and claim these lower emissions in their reporting.

Waddell emphasized that mobilizing freight customers committed to reducing carbon emissions from their value chains will be key to faster decarbonization. He mentioned the Zero Emission Maritime Buyers Alliance (ZEMBA), created and facilitated by the Aspen Institute Energy and Environment Program, as a primary example. ZEMBA is a first-of-its-kind buyers’ group working to accelerate the most sustainable, scalable, and economically viable solutions for the maritime sector. In its inaugural tender, completed in 2024, seventeen companies committed to purchasing over 1 billion twenty-foot equivalent unit (TEU) nautical miles of zero-emission shipping, achieving more than a 90 percent GHG reduction on a lifecycle basis and avoiding at least 82,000 tonnes of CO₂e. In its second tender, which just opened, ZEMBA is focused on aggregating demand for e-fuel powered shipping, seeking to abate approximately 500,000 metric tonnes of greenhouse gases over 3-5 years starting in 2027.



What We Heard

Oceans North's Associate Director of Marine Climate Action, Amy Nugent, moderated the panel, and Oceans North staff facilitated a discussion among attendees on the opportunities for zero-emission shipping to expand to other Canadian net-zero supply-chain commitments.

Oceans North asked: What solutions have immediate potential? Which ones seem harder to achieve? What supports are needed, including financial, policy, and market supports?

Key Takeaways

More awareness is needed among the public, sustainability professionals, and corporations in Canada regarding the role of marine shipping in our supply chains and emissions.

Civil society organizations have a role to play in helping drive conversations between government, community, and the private sector.

Governments can do more to build awareness of marine emissions and include the marine sector in other climate programs and commitments, including financial incentives.

Collective Challenges

- Industry is looking for “off the shelf” tools, while many tools and intermediaries, for example energy consortiums, are in relatively early stages of development.
- Investors' interest in cost cutting applies further negative pressure to the transition, meaning that binding level-setting regulations and accessible financing are both needed to support new investments.
- There is e-fuel competition with other sectors across the economy and there is unlikely to be one energy source or one fuel that dominates the entire sector. We must make localized business cases accounting for strengths and opportunities on a place-basis.
- Innovative approaches aren't what comes from the IMO and other institutional organizations leading the discussions, as their focus is often on finding a common pathway.
- There's the potential to swap “bad for bad.” Low- and zero-carbon fuels and technologies can also come with environmental and health risks. Specifically:
 - Ammonia or nitrogen pose significant safety and environmental dangers. LNG has a high rate of methane slippage, which increases its GHGs significantly, and is not capable of reaching zero-emissions.
 - Low-carbon or zero-emission vessels can still have a significant environmental impact, especially in sensitive ecosystems such as in the Arctic.
- Industry leaders like Veer have a net-zero approach but can face several challenges as non-incumbents and non-fuel producers.



Solutions that Emerged

- Buyers' alliances and collaborative supply-and-demand partnerships for zero-emission technologies and long-term supply agreements to support the development of zero-emission fuels.
- Continued focus on the implementation of green shipping corridors.
- Awareness and uptake of tools and toolkits, such as book-and-claim, port electrification playbooks, cost-abatement and TRL analyses, open-sourced designs and business cases.
- Continued regulatory tools at global and national levels and similar financing and financial derisking as is available to other sectors to give momentum to the transition.
- Continued and growing support to decarbonize the whole supply chain, including ports and everything in between.

Questions for Future Sessions

We hope these conversations continue. With only one hour for the session, many questions were raised by participants that Oceans North will use to animate further sessions and content. These include:

- What guardrails are needed to ensure we are not replacing one bad fuel for another?
- Who will build a functional collaboration across the Canadian marine sector that accounts for proprietary interests but helps the sector learn from and catch up to where other sectors are in terms of progress on emissions reductions? How and when?
- When will investors see returns? How much more capital will be needed to transition?
- What are our technology biases? Are we receptive enough to technologies that may challenge present-day ship design, fuel-supply networks, and trade routes? For example, one person asked whether on-ship hydrogen cells have been discounted too quickly based on assumptions about cargo load and ship design.
- What current supply-chain initiatives are best positioned to extend to marine shipping?
- What measurement tools are available to ESG (Environmental, Social and Governance) professionals inside businesses to help account for and reduce emissions from shipping?



Thank you



We are grateful to those who attended this workshop and engaged with our team and panelists.

A special thank you to our panelists: Charles Haines, Danielle Southcott, and Andrew Waddell. Their wisdom was critical to building our understanding and enthusiasm for the work ahead.

Thank you also to the Globe Series for the efforts and support in bringing this session to GLOBEXCHANGE.



**OCEANS
NORTH**

March 2025